



Office de la propriété
Intellectuelle
du Canada

Un organisme
d'Industrie Canada

Canadian
Intellectual Property
Office

An Agency of
Industry Canada

PCT/CA

03/ 01305

25 SEPTEMBER 2003 25.09.03

REC'D 10 OCT 2003

WIPO PCT

*Bureau canadien
des brevets*
Certification

*Canadian Patent
Office*
Certification

La présente atteste que les documents
ci-joints, dont la liste figure ci-dessous,
sont des copies authentiques des docu-
ments déposés au Bureau des brevets.

This is to certify that the documents
attached hereto and identified below are
true copies of the documents on file in
the Patent Office.

Specification and Drawings, as originally filed, with Application for Patent Serial No:
2,401,917, on September 6, 2002, by **TESCO CORPORATION**, assignee of Per G.
Angman and Bruno Walter, for "Expandible Bit".

PRIORITY DOCUMENT
SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH
RULE 17.1(a) OR (b)

L. Reginbal
Agent certificateur/Certifying Officer

September 25, 2003

Date

Canada

(CIPO 68)
04-09-02

OPIC



CIPO

Abstract

A bit has been invented that is expandable from a collapsed position, useful for tripping, to an radially expanded position for use. The bit is useful to form a borehole through an earthen formation. In one embodiment, the bit can be used alone, without a separate under reamer, to expand a well bore below a casing string, either during casing drilling or when extending a well bore below an installed casing string. The bit cutter face includes a center cutter face on a mandrel and an outer cutter face mounted on an expandable section of a housing disposed about the mandrel. The outer cutter face can be expanded by axial movement of the mandrel within the housing.

EXPANDABLE BIT

Field of the Invention

This invention is directed to a drill bit for use in drilling a borehole through an earthen formation and, in particular, a drill bit that is expandable from a tripping position to a position for use.

Background of the Invention

A drill bit is used when drilling a borehole through an earthen formation. In some applications, such as casing drilling or extending a borehole below a cased section, the drill bit must be sized to fit through the casing drift diameter, but capable of drilling a borehole to a gauge larger than the outer diameter of the casing. To achieve this, an under reamer is often used with a pilot bit.

The under reamer is spaced back from the pilot bit and is generally pivotally attached such that it can be stored for tripping and expanded radially outwardly for use.

Summary of the Invention

A bit has been invented that is expandable from a collapsed position, useful for tripping, to an radially expanded position for use. The bit is useful to form a borehole through an earthen formation. In one embodiment, the bit can be used alone, without a separate under reamer, to expand a well bore below a casing string, either during casing drilling or when extending a well bore below an installed casing string.

In accordance with one broad aspect of the present invention there is provided a drill bit for forming a borehole through an earthen formation, the drill bit comprising: an upper end formed to be connectable to a drilling drive means, a lower end opposite the upper end; a center axis extending between the upper end and the lower end; a center cutter face on the lower end, the center cutter face selected to be useful to drill through an earthen formation; and an arm positioned between the center cutter

Referring to Figures 13 and 14, there is shown another expandable bit according to the present invention. The bit is generally similar to the bit of Figure 1 and includes a mandrel 212, a housing 214 and bit arms 215 supported on the housing. However, the mandrel and the housing are formed such that in the expanded position, mandrel 212 is distanced out from the lower end 214b of the housing. As such, the cutter faces, formed by cutters 216, on the bit arms are spaced from the center cutter face 218a on the mandrel during operation of the bit to drill a borehole.

Ports 257 open into center cutter face 218a and are positioned in channels 280 formed in the center cutter face. Channels 280 which substantially align with channels 282 on the bit arms, when the bit is in the expanded position, to facilitate flow of fluid from ports 257 along the cutter face to the clean and lubricate cutters 216 on the arms.

Although preferred embodiments of the present invention have been described in some detail hereinabove, those skilled in the art will recognise that various substitutions and modifications may be made to the invention without departing from the scope and spirit of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A drill bit for forming a borehole through an earthen formation, the drill bit comprising: an upper end formed to be connectable to a drilling drive means, a lower end opposite the upper end; a center axis extending between the upper end and the lower end; a center cutter face on the lower end, the center cutter face selected to be useful to drill through an earthen formation; and an arm positioned between the center cutter face and the upper end, the arm selected to be radially moveable relative to the center axis between a stored position defining a stored bit diameter and an expanded position defining an expanded bit diameter, greater than the stored bit diameter; and an outer cutter face disposed on the arm and exposable for use to drill through an earthen formation when the arm is in the expanded position.

2. The drill bit of claim 1, wherein the drilling drive means to which the upper end is connectable is selected from the group consisting of: a drill string; a sub

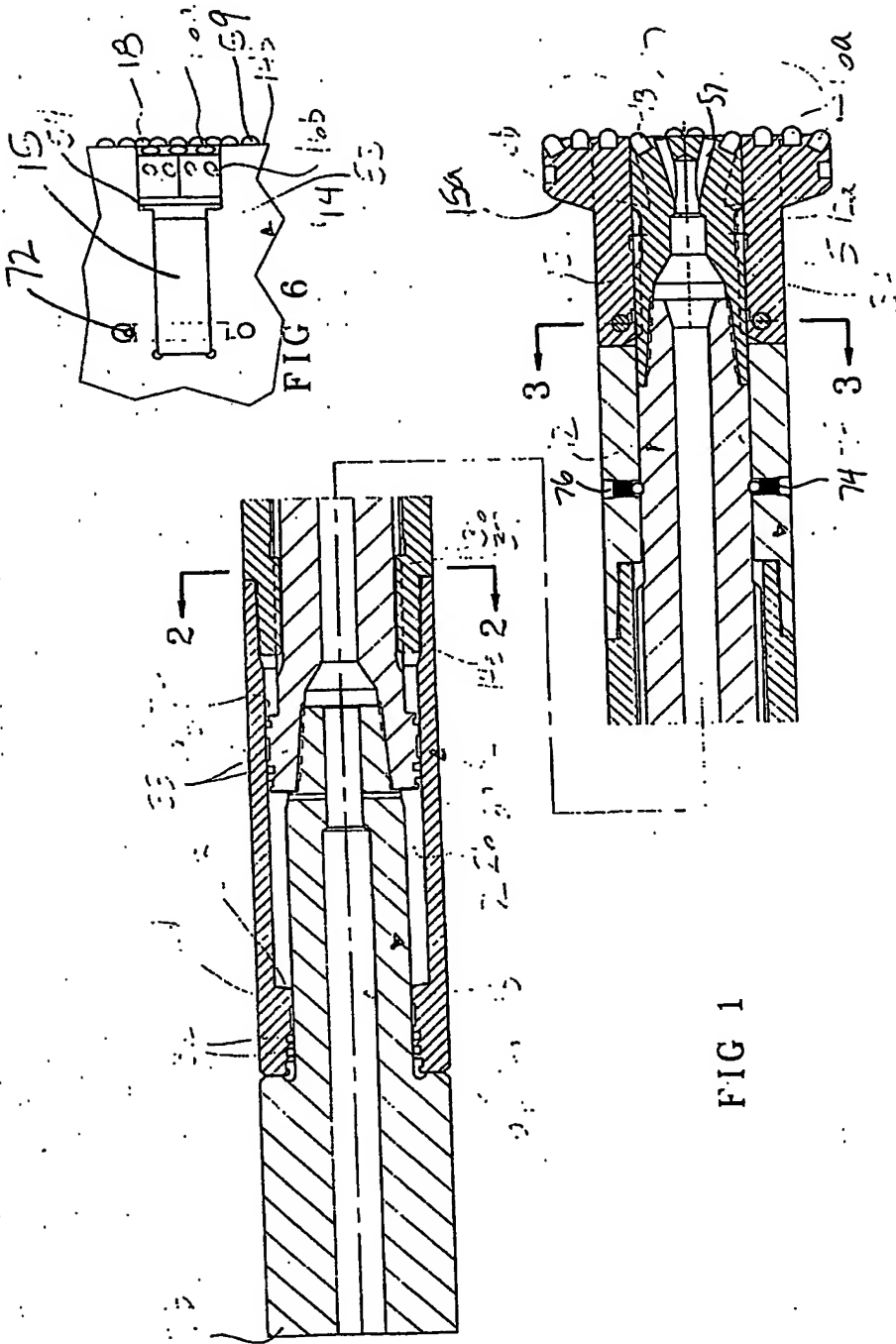


FIG 1

BEST AVAILABLE COPY